Lean Six Sigma

A Methodology for Cultural Change and Continuous Process Improvement (CPI)

Lean Six Sigma: A Vision

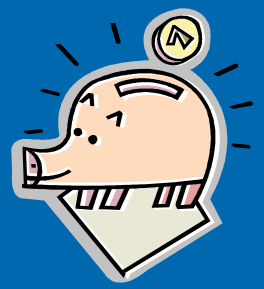
Empowered People Operating in a Culture and Climate of Creativity & Innovation

Constantly Eliminating Waste and Variation

Reduced Costs & Increased Productivity

Meeting Warfighter Needs

Lean Six Sigma: What is it?



- Lean and Six Sigma are both process improvement methodologies
- Lean is about speed and efficiency
- Six Sigma is about precision and accuracy – leading to data-driven decisions
- Both rooted in the 1980s (and earlier)
  - Lean arose as a method to optimize auto manufacturing
  - Six Sigma evolved as a quality initiative to reduce variance in the semiconductor industry

Why Lean and Six Sigma

- Six Sigma will eliminate defects but it will not address the question of how to optimize process flow
- Lean principles exclude the advanced statistical tools often required to achieve the process capabilities needed to be truly 'lean‘
- Each approach can result in dramatic improvement, while utilizing both methods simultaneously holds the promise of being able to address all types of process problems with the most appropriate toolkit.
  - *For example, inventory reduction not only requires reducing batch sizes and linking operations by using Lean, but also minimizing process variation by utilizing Six Sigma tools.*

Lean Six Sigma Goals and Benefits

- Achieve total customer satisfaction and improved operational effectiveness and efficiency
  - Remove wasteful/non-value added activities
  - Decrease defects and cycle time, and increase first pass yields
- Improve communication and teamwork through a common set of tools and techniques

  (a disciplined, repeatable methodology)
- Develop leaders in breakthrough technologies to meet stretch goals of producing better products and services delivered faster and at lower cost

Lean Six Sigma Requires Behavioral Change

- Lean Six Sigma Challenges Us to:
  - Think Differently
  - Work Differently
  - Ask Questions and Challenge the Status Quo
  - Make Decisions With Facts and Data
  - Use New Principles, Tools and Methodologies

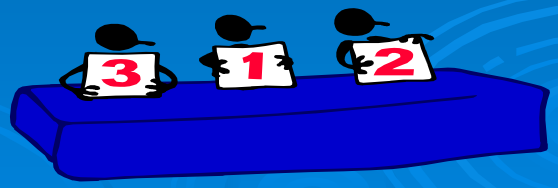
"Early-on, when culture and change compete, culture wins."
- Tom Quan, GlaxoSmithKline

To Successfully Deploy Lean Six Sigma

- Start with the customer … listen, listen, listen
- Leadership commitment and alignment … go beyond the words … change behavior
  - Create momentum for change
  - Develop need, vision and plan
  - Communicate, communicate, communicate
  - Repeatedly execute and assess
  - Develop necessary skill sets to obtain the desired future state at all levels of the organization
- Involve Everyone: Leadership, Champion, Master Black Belt, Black Belt, Green Belt, Employees

Basic Questions

- What are the customer needs?
- Do our products or services
  - answer the Voice of the Customer
  - at a price he is willing to pay?
- How do we know?



Lean Six Sigma Principles

- Specify value in the eyes of the customer
- Identify the value stream and eliminate waste / variation
- Make value flow smoothly at the pull of the customer
- Involve, align and empower employees
- Continuously improve knowledge in pursuit of perfection

Lean Six Sigma: A Powerful Methodology (DMAIC)

what is important to the customer:

Project Selection

Team Formation

F

how well we are doing:

Collect Data

Construct Process Flow

Validate Measurement System

the process:

Analyze Data

Identify Root Causes

the process performance measures:

Prioritize root causes

Innovate pilot solutions

Validate the improvement

the process gains:

Ensure Solution is Sustained

The Tools and Techniques

- Benchmarking
- FMEA
- IPO Diagram
- Kano's Model
- Knowledge Based Mgt
- Project Charter
- SIPOC Model
- Quality Function Deployment
- Voice of Customer
- Task Appraisal / Task Summary
- Value Stream Mapping

- Confidence Intervals
- Measurement System Analysis
- Nominal Group Technique
- Pairwise Ranking
- Physical Process Flow
- Process Capability Analysis
- Process Flow Diagram
- Process Observation
- Time Value Map
- Value Stream Mapping
- Waste Analysis

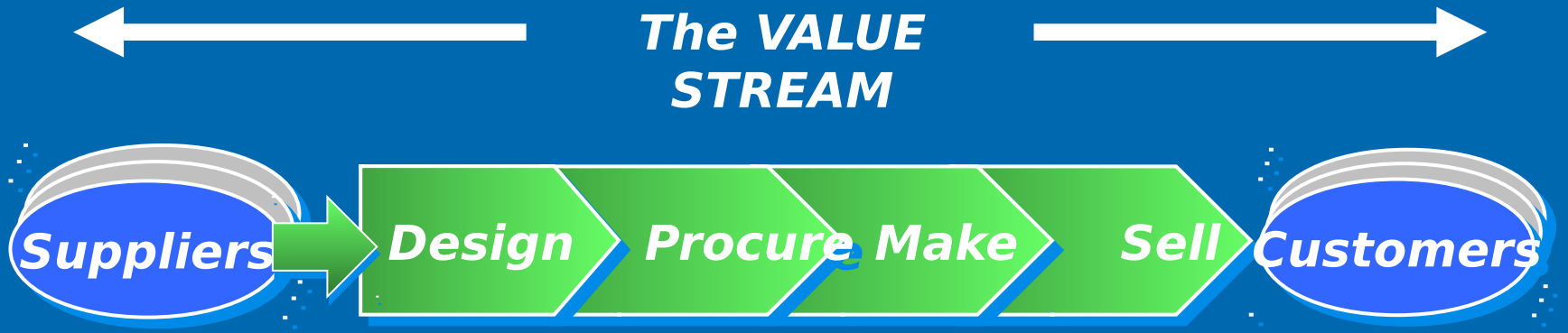
- Affinity Diagram
- Brainstorming
- Cause & Effect Diagram
- e-test
- F-test
- Fault Tree Analysis
- FMEA
- Histogram
- Historical Data Analysis
- Pareto Chart
- Reality Tree
- Regression Analysis
- Scatter Diagram
- t-test
- Thematic Content Analysis
- Tukey End Count Test
- 5 Whys

- DFSS
- DOE
- Kanban
- Mistake Proofing
- PF/CE/CNX/SOP
- Standard Work
- Takt Time
- Theory of Constraints
- Total Productive Maintenance
- Visual Management
- Work Cell Design
- 5S Workplace Organization

- Control Charts
- Control Plan
- Reaction Plan
- Run Charts
- Standard Operating Procedures

Definition of a Value Stream

The VALUE STREAM is the entire set of processes or activities performed to transform the products and services into what is required by the customer.

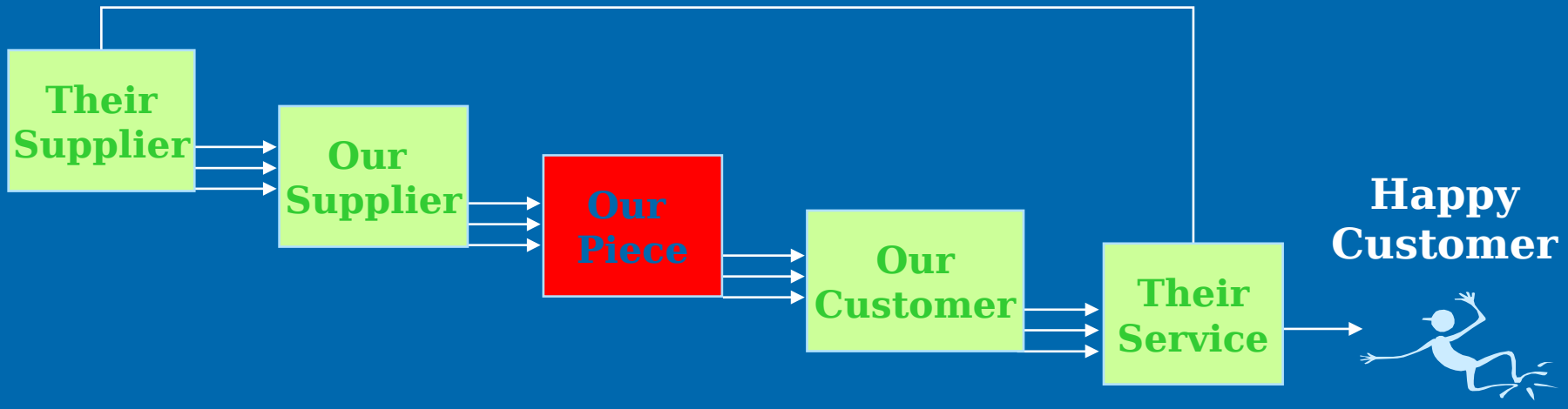


A Primary Focus is TIME,

Product and / or Service Flow

Information Flow: Quickly In All Directions

Understanding the Value Stream



- We are often part of a value creating stream
- Ultimately, the intent of the stream is to answer the end-user's needs
- Knowing who our customers are is the first step in understanding the stream; our primary customer may not be the end-user
- Knowing how the stream and our piece works or doesn't work in meeting customer needs is what Lean Six Sigma is about

Summarizing the Power of Lean Six Sigma

- Provides a *world class* business strategy
- Encourages a *common vision* and *common language* shared by all
- Promotes *teamwork* and REWARDS success
- Combines *aggressive goals* with a *method* and a set of *tools*
- Requires the *application* of *tools* throughout *entire lifecycle* of a product or service
- Produces knowledge for *improved cycle time*, *reduced defects*, and *lower cost*

Better **products and services**
delivered *faster and* at *lower cost*
=
Improved Customer Value